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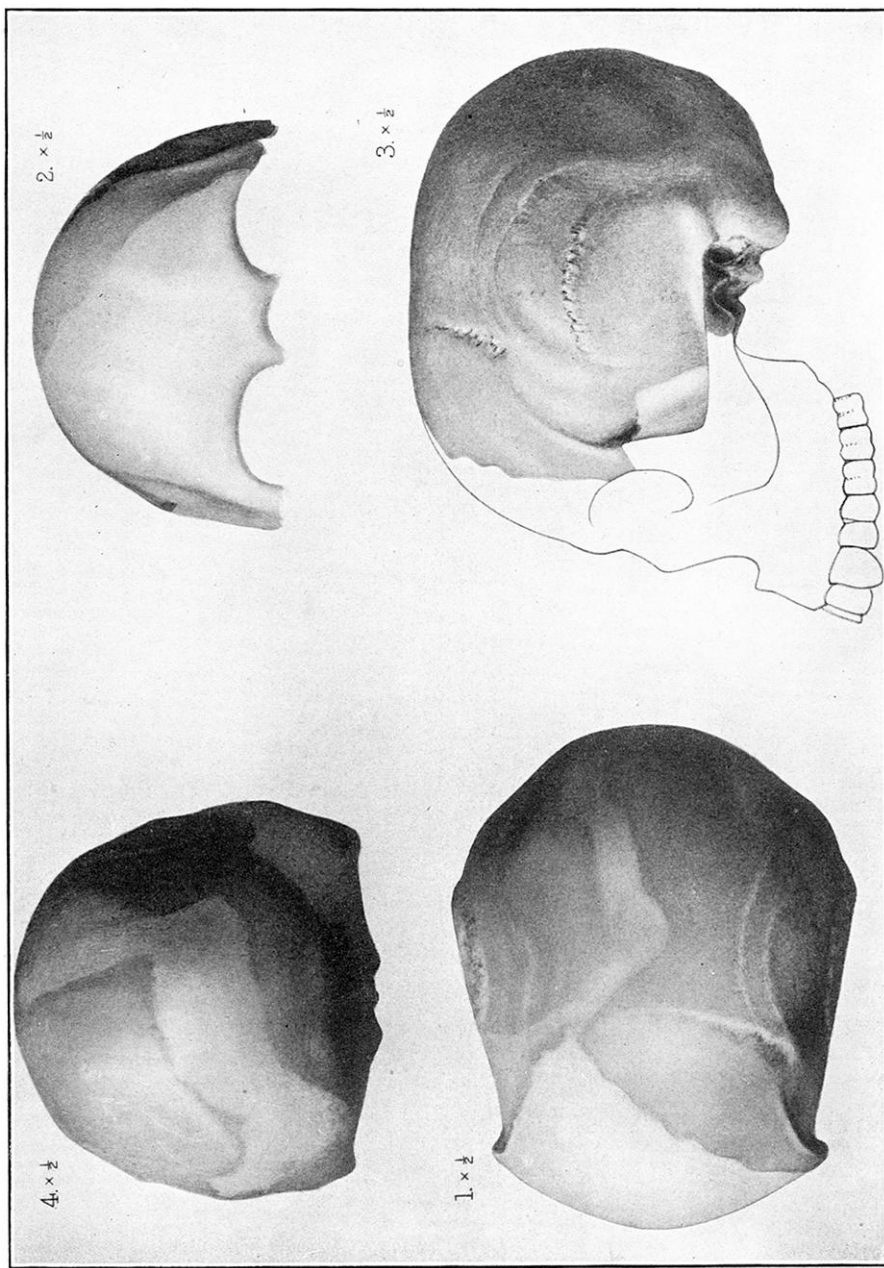
ANCESTOR HUNTING: THE SIGNIFICANCE OF THE PILTDOWN SKULL

By GEORGE GRANT MACCURDY

ARE we proud of our remote ancestors? Would they be willing to acknowledge us as lineal descendants? Be this as it may, we pay them, perhaps unwittingly, the high compliment of a perennial quest for their portraits, a quest which quite recently has taken us back, especially in England, much farther than that estimable institution, the College of Heraldry, had ever dreamed of going.

In many of its aspects the latest discovery is perhaps the most remarkable of all. When attending the International Congress of Prehistoric Anthropology and Archeology in Geneva last September I was given to understand that the next great event in the prehistoric field would be reported from the south of England. As the matter was being kept a profound secret there was nothing to do but to wait for details until official announcement should be made. This came at a meeting of the Geological Society in London on December 18.

Briefly the facts are these. Several years ago in passing up the Ouse valley from his home in Lewes (Sussex) into the Weald, Mr Charles Dawson, Fellow of the Society of Antiquaries and of the Geological Society, noted that the roadway had been mended recently with flints of a kind that he had not seen before in that region. These were traced to their source, which proved to be a pit near Piltdown Common, Fletching (Sussex). Nothing was found that day, but on a subsequent visit to the pit, one of the men handed to Mr Dawson a part of an "unusually thick human parietal bone." A portion of the frontal bone of the same skull including part of the left brow ridge was picked up by Mr Dawson himself in 1911 from one of the refuse heaps. He took this piece to Dr A. Smith Woodward of the Natural History Museum, Lon-



EOANTHROPUS DAWSONI FROM A GRAVEL PIT NEAR PILTDOWN COMMON, FLETCHING (SUSSEX). RESTORATION
After Dawson and Woodward, *Quar. Jour. Geol. Soc.*, LXIX, pl. XVIII, 1913.

don, who thereafter took part in the search. Other fragments of the skull were recovered from the refuse heaps; the right half of a lower jaw with first and second molars in situ was dug out of the undisturbed gravel by Mr Dawson. At precisely the same level, some four feet below the surface, and within a yard of the point where the jaw was found, Dr Woodward dug up a piece of the occipital bone of the cranium. By reason of their proximity as well as in point of size, the cranium and lower jaw may be "referred to the same individual without any hesitation." The bones are mineralized and stained to a ruddy-brown color, as are the sands and flints among which they were found.

The most diligent search has failed to reveal other parts of this human skeleton. But the finding of fossil animal remains in the same pit and stratum, both associated with rudely worked flints, makes Piltdown one of the most extraordinary prehistoric stations ever uncovered. The fossils include broken pieces of a molar of a Pliocene type of elephant, a cusp of the molar of a mastodon, and teeth of *Hippopotamus*, and *Castor*. On the surface of an adjacent field, they found the tooth of *Equus*, and fragments of an antler of *Cervus elaphus*. These were all in the same mineralized condition and of the same color as the human bones.

When the pieces of the cranium were put together it was possible to estimate the cranial capacity, which Dr A. Smith Woodward gives as not less than 1070 c.c. The bones are tough and hard, and the walls of the brain-case exceedingly thick, the average thickness of the frontal and parietal being at least one centimeter. The face and the greater part of the forehead are missing. The length of the cranium from glabella to inion is about 190 mm., while the greatest parietal width is 150 mm. The forehead is steeper and the brow ridge feebler than in the later Neanderthal type. The cranium is low and broad, with a marked flatness on top, and the mastoid processes are relatively small.

The lower jaw is in some respects more primitive than the cranium. The horizontal ramus is rather slender, resembling in shape that of a young chimpanzee, especially in the region of the symphysis. Only two teeth, the first and second molars, were found,

and these were in their sockets. They are distinctly human, although relatively of large size and narrow, thus requiring more linear space for their setting in the jaw. Each has a fifth cusp. The crowns are worn flat by mastication, indicating that the canines were not so prominent as to interfere with essentially human proc-

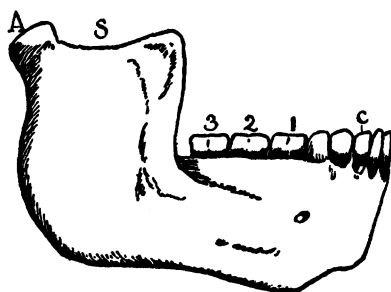


FIG. 1. Heidelberg man.



FIG. 2. Chimpanzee.

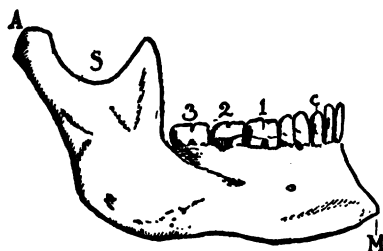


FIG. 3. Modern man.

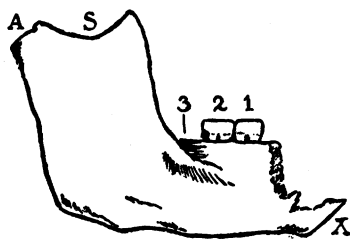
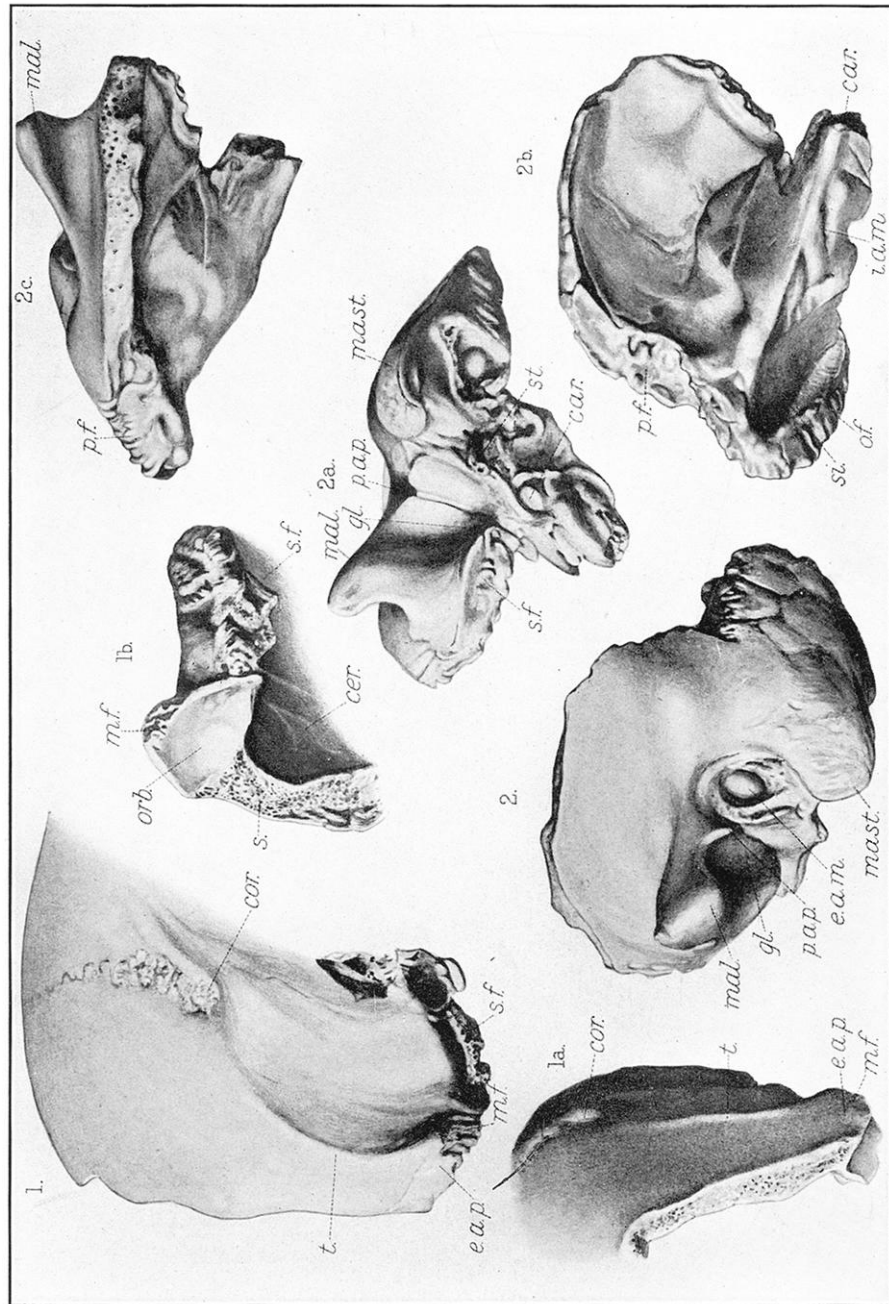


FIG. 4. Piltown man.

FIG. 48.—A, Articular process or condyle (broken in the Piltown jaw). S, Sigmoid notch. c, Canine tooth. 1, 2, 3, First, second, and third molars. (From a sketch by Sir Ray Lankester in *The Daily Telegraph*.)

esses of trituration; also that the individual was of adult age. The ascending ramus is broad, and the sigmoid notch at the top in front of the articular process is shallow. In these respects the Sussex lower jaw approaches that found near Heidelberg. The feeble brow ridges, the small area for the insertion of the temporal muscles, the rather insignificant mastoid processes, and the slender lower jaw point to a member of the female sex. Dr Woodward regards the skull as belonging to a hitherto unknown species of *Homo*, for which he proposes the name *Eoanthropus dawsoni*.

A study of the cast of the cranial cavity would seem to justify



EOANTHROPUS DAWSONI

Fig. 1. Frontal from left side: (1a) from the front and (1b) from below. *cor* = cerebral surface; *cor* = coronal suture; *e. a. p.* = external angular process; *m. f.* = facette for malar; *orb* = roof of orbit; *s* = broken section of frontal bone; *s. f.* = facette for sphenoid; *t.* = temporal ridge.
 Fig. 2. Left temporal, lacking the upper part of the squamous wing, outer view; (2a) lower view, (2b) inner view, and (2c) upper view. *car.* = openings of caroid canal; *temp.* = external auditory meatus, blocked by a pebble; *gl.* = glenoid fossa; *i. a. m.* = internal auditory meatus; *mal.* = process for malar; *mast.* = mastoid process; *o. f.* = suture for occipital; *p. a. p.* = post-articular process; *p. f.* = suture for parietal; *s. f.* = suture for sphenoid; *st.* = broad groove for lateral sinus; *st.* = base of styloid process. Q. J. G. S., LXIX, pl. XIX, 1913.

the appellation. This has been done thoroughly by Professor G. Elliot Smith, one of the highest authorities on the human brain, who finds that while it bears a similarity to the brain-cases of Gibraltar and La Quina, both paleolithic and supposedly feminine, the Piltdown brain-case is smaller and more primitive in

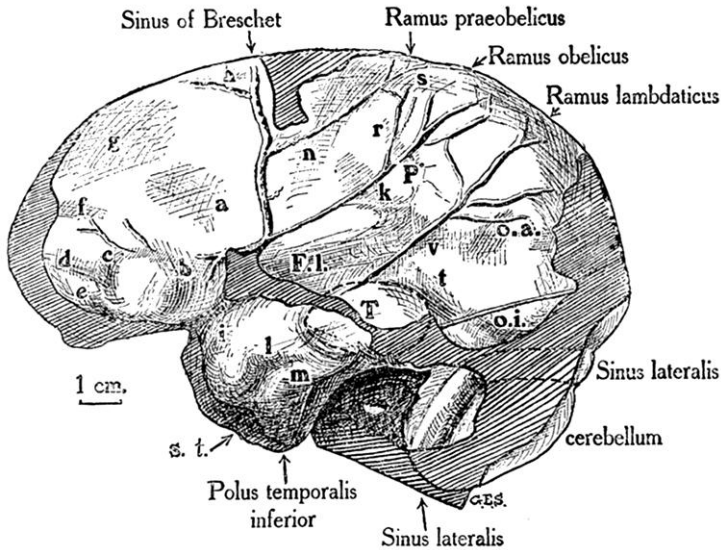


FIG. 49.—Left norma lateralis of the internal cast of the skull from Piltdown. The parallel shading shows the extent of the missing cranial wall. After Prof. G. Elliott Smith in *Q. J. G. S.*, LXIX, 1913.

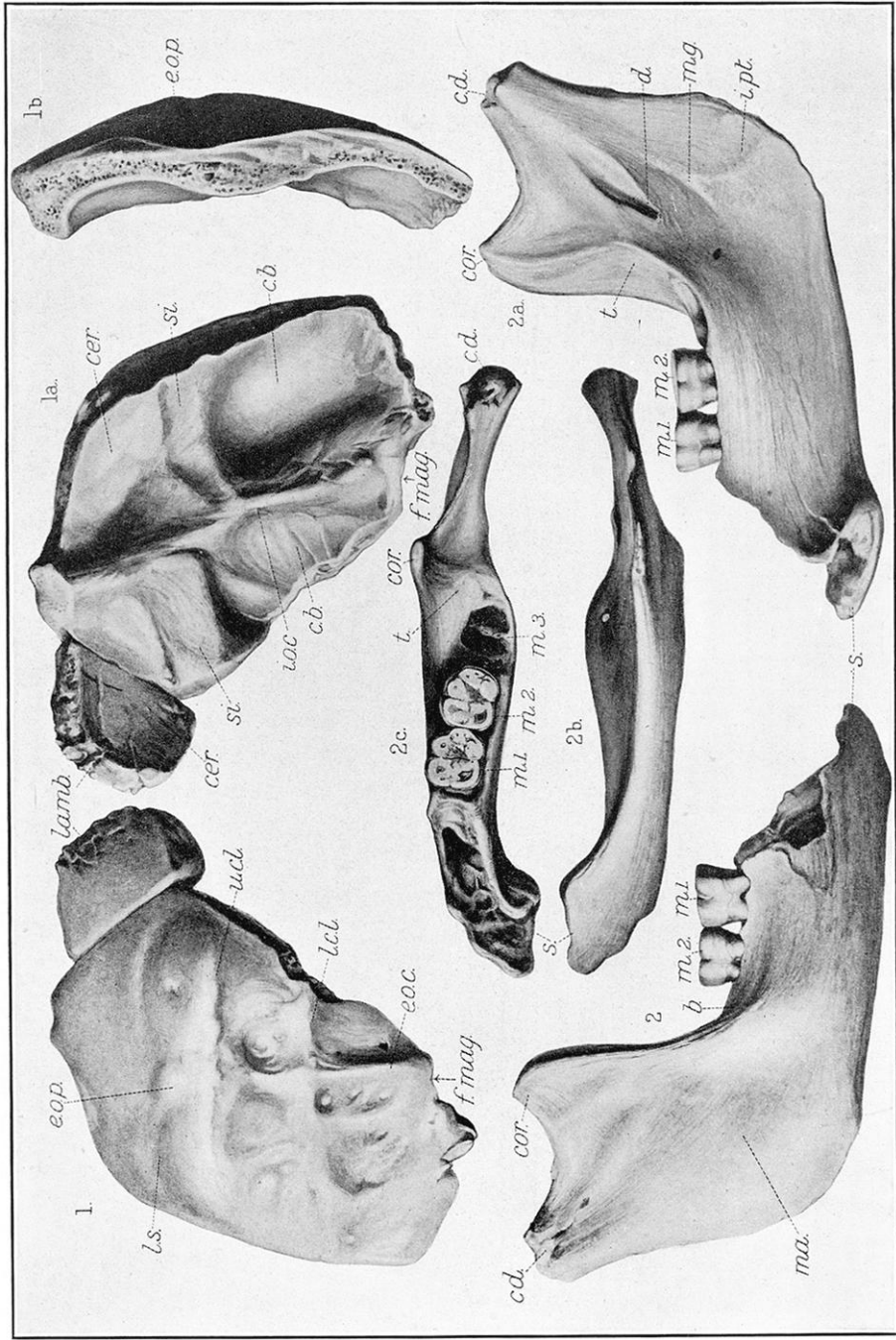
form than these. The most striking feature is the “pronounced gorilla-like drooping of the temporal region, due to the extreme narrowing of its posterior part, which causes a deep excavation of its under surface.” This feeble development of that portion of the brain which is known to control the power of articulate speech is most significant. To Professor Smith the association of a simian jaw with a cranium more distinctly human is not surprising. The evolution of the human brain from the simian type involves a tripling of the superficial area of the cerebral cortex; and “this expansion was not like the mere growth of a muscle with exercise, but the gradual building-up of the most complex mechanism in existence. The growth of the brain preceded the refinement of the features and the somatic characters in general.”

The associated worked flints have been compared with the so-called eoliths from the North and South Downs. According to Sir Ray Lankester, "many of the flints in this Piltdown gravel have been worked by early man into rough implements. They are of flat shape, often triangular in area and show a coarse but unmistakable flaking of human workmanship." He considers them ruder and earlier than any flint implements that can be rightly called Chellean.

Scientists have often remarked on the paucity of human remains that could with certainty be referred to a very early epoch, a condition which more than anything else has kept in check the science of prehistoric anthropology. After all there is no evidence quite so incontrovertible as the presence of man's own skeletal remains. We may justly differ on the question as to whether or not a given flint is an artifact; not so in case of a human skull. When the skull is found associated with rudely flaked flints the nature of which might be questioned if occurring alone, the burden of proof is at once shifted from those who believe them to have been utilized by man to those who would call them the work of Nature. On the other hand this does not by any means let down the bars to indiscriminate claims for the artifact nature of all primitive-looking flints. If a great majority of all the so-called eoliths or pre-Chellean types were thrown away, there would still be left enough to do business with, as the case of Piltdown proves.

Personally I have for years been a believer in the prehistoric possibilities of southern England because of the outcrops of flint-bearing Chalk stretching from Dorset and Sussex on the south to Caddington and the Cromer Forest Beds on the north.¹ Of all raw materials flint is perhaps the best suited to tempt nascent *Homo* to become a tool-user. It is the most utilizable of all stones, because of its hardness and mode of fracture, leaving a sharp, straight edge. Flint flakes can be produced by purely natural means. The accidental stepping on one of these would suffice, after repetition at least, to prove their efficiency. Thus the oldest and most primitive implements that have come down to us are utilized flint chips. Once the flint-using habit was formed, it spread; and when the

¹ *American Anthropologist*, vol. 7, p. 442, 1905.



EOANTHROPUS DAWSONI

Fig. 1. Imperfect occipital in outer view; (1a) inner view, and (1b) broken vertical section, left side. *dh.* = cerebellar fossa; *cer.* = cerebral fossa; *e. o. c.* = external occipital crest; *e. o. p.* = external occipital protuberance; *f. mag.* = foramen magnum; *t. o. c.* = internal occipital crest; *lamb.* = portion of lambdoid suture; *l. c. l.* = lower curved line; *t. s.* = linea suprema; *si.* = groove for lateral sinus; *u. c. l.* = upper curved line.

Fig. 2. Right mandibular ramus in outer view, imperfect at the symphysis; (2a) inner view, and (2b) lower view, and (2c) upper view. *b.* = ridge below origin of buccinator muscle; *cd.* = neck of condyle; *cor.* = coronoid process; *d.* = inferior dental foramen; *f. pt.* = insertion of internal pterygoid muscle; *m. 1.*; *m. 2.* first and second molars; *m. 3.* = socket for third molar; *ma.* = insertion of masseter muscle; *s.* = incurved bony flange of symphysis; *i.* = insertion of temporal muscle. About two-thirds natural size. *Q. J. G. S.*, LXIX, pl. XX, 1913.

natural supply became scarce it was supplemented by artificially produced chips. The chief sources of flint are the chalk deposits of Cretaceous age that occur so plentifully in western Europe—as seen for example in the white cliffs along the southern coast of England. Approaching one of these cliffs, one finds it studded with parallel beds of flint nodules. Wherever flint occurs, stone-age relics are apt to be abundant.

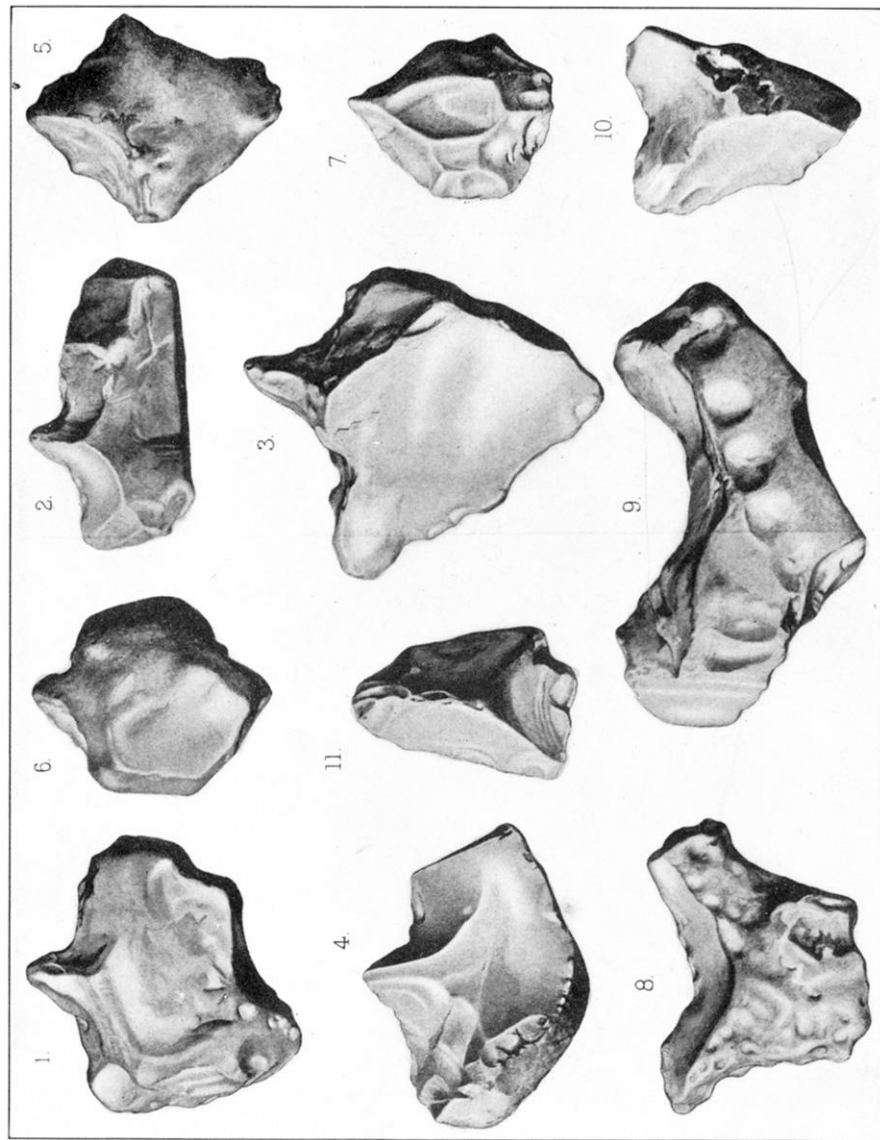
It is not generally known to Channel voyagers that the white cliffs at Beachy Head and again more than 50 miles farther east at Dover are the bases of a great anticlinal fold whose axis passes from Dungeness in a westerly direction through Hampshire. The crest of the fold which once towered high over what is now the Weald disappeared ages ago, leaving two slender tongues from the great Chalk plain of Dorset, Wiltshire, and Hampshire, the tip of one (the North Downs) being at Dover and that of the other (the South Downs) at Beachy Head. The scene of Dawson's epoch-making discovery is almost due north of Beachy Head, just beyond the South Downs plateau and hence near the southern limits of the Weald. The Ouse takes its rise in the Weald, flows southward, cutting through the South Downs and emptying into the Channel at New Haven.

The Piltdown gravels are 80 feet higher than, and nearly a mile distant from the present stream-bed of the Ouse. This signifies a great age for the deposit. While it may not be so old as the patches of red clay with rude flints on the Downs north of Ightham as well as on the South Downs at Beachy Head and Eastbourne, some at least of the materials composing it may once have been a part of older deposits. The broken edges of all the bones, human as well as animal, show more or less wear. The remains of the Pliocene elephant (*Stegodon*) and especially *Mastodon* are most worn, and are evidently derived from some older deposit as they are typical Pliocene forms. The teeth of *Hippopotamus* might be either upper Pliocene or Pleistocene; but the beaver teeth are probably Pleistocene. The gravel bed is probably early Pleistocene. That rude implements of the eolithic type were found associated with these human remains would seem to give to such implements a stand-

ing hitherto denied them by some authorities; unless it can be proved that they were derived from a deposit antedating that which originally contained the human remains. Their pedigree was needed in order to make industrial genealogy complete, just as the skull itself was needed to fill a gap in man's physical evolution. When the two sets of evidence are found intimately associated, they will serve as a solid basis for further advances in the domain of prehistoric anthropology. It remains for the geologists to determine whether in Piltdown the prehistorian's "Rosetta stone" has at last been found.

In the *Smithsonian Report* for 1909 (p. 581) I called attention to valley deposits as being the well-nigh inexhaustible storehouse of archeology; I was therefore prepared for such a striking confirmation as Piltdown affords. The one great drawback about valley deposit finds is that in the very nature of the case they must ever be in a large measure fortuitous. Cave deposits are so circumscribed that all one has to do is to find his cave and set his men to work. An expert can even afford to be on the spot almost continuously until the work is completed. On the other hand, untutored workmen are constantly digging in hundreds of sand, gravel, and clay pits over wide areas. Continuous expert control is out of the question without an international subsidy on a large scale. The result is that important data are overlooked and valuable specimens are smashed by pick and shovel and irretrievably lost to view. When by chance a find is made its authenticity is often open to grave question.

When the man of Sussex hunted in the valley of the Ouse was there an English Channel? The present Channel dates from the very close of the paleolithic. Raised beaches near Calais and on the south coast of England testify to the existence of an earlier channel, possibly during the Chellean epoch. At any rate the man of Sussex must have had neighbors to the south on what is now French soil. If there was no Channel the Ouse and the Somme were tributaries of the same large stream that flowed westward emptying into the Atlantic Ocean somewhere south of the Scilly islands, and the same race would have made common hunting ground of this great valley



EOLITHS FROM THE PILTDOWN GRAVEL BED

Figs. 4 and 5 are from Fairlight, near Hastings. Fig. 2 was found in the middle stratum. The borer and hollow scraper are the dominant types. After Dawson and Woodward in *Q. J. G. S.*, LXXIX, 1913.

system, for in a gravel terrace at Abbeville, d'Ault du Mesnil years ago found remains of practically the same fauna; and in a very old high-level gravel terrace at Amiens, Commont has noted the presence of a rude pre-Chellean flint industry akin to that at Piltdown. We may therefore reasonably expect to find in the Somme valley the osseous remains of this old race.

In Spain, at Torralba, near the crest of the Sierra Ministra east of Madrid, the Marquis of Cerralbo has recently uncovered a very ancient camp site that has yielded a pre-Chellean and Chellean industry mingled with the bones of *Elephas* (*E. antiquus* and perhaps *E. meridionalis*), *Rhinoceros etruscus*, *Equus*, and *Cervus elaphus*. Both bones and implements occur so plentifully that the Marquis may yet be so fortunate as to turn out a human skull, for the site was not yet half exhausted on the occasion of my visit to Torralba last summer.

Twenty years elapsed between the finding of *Pithecanthropus* and *Eoanthropus*. During the intervening period only one discovery of human osseous remains approaching these in importance was made: the lower jaw from the Mauer sands near Heidelberg, found in 1907. It is too early to say just what ethnic relations existed among these three ancestral forms; they probably represent sections, not of one branch but of different branches of the same family tree. In point of age the Piltdown skull probably belongs to an intermediate stage. All three are older by far than *Homo neandertalensis*, which in turn is older than the artistically inclined cavemen who decorated their haunts with engravings and frescoes of their favorite game animals: the bison, horse, mammoth, and reindeer.

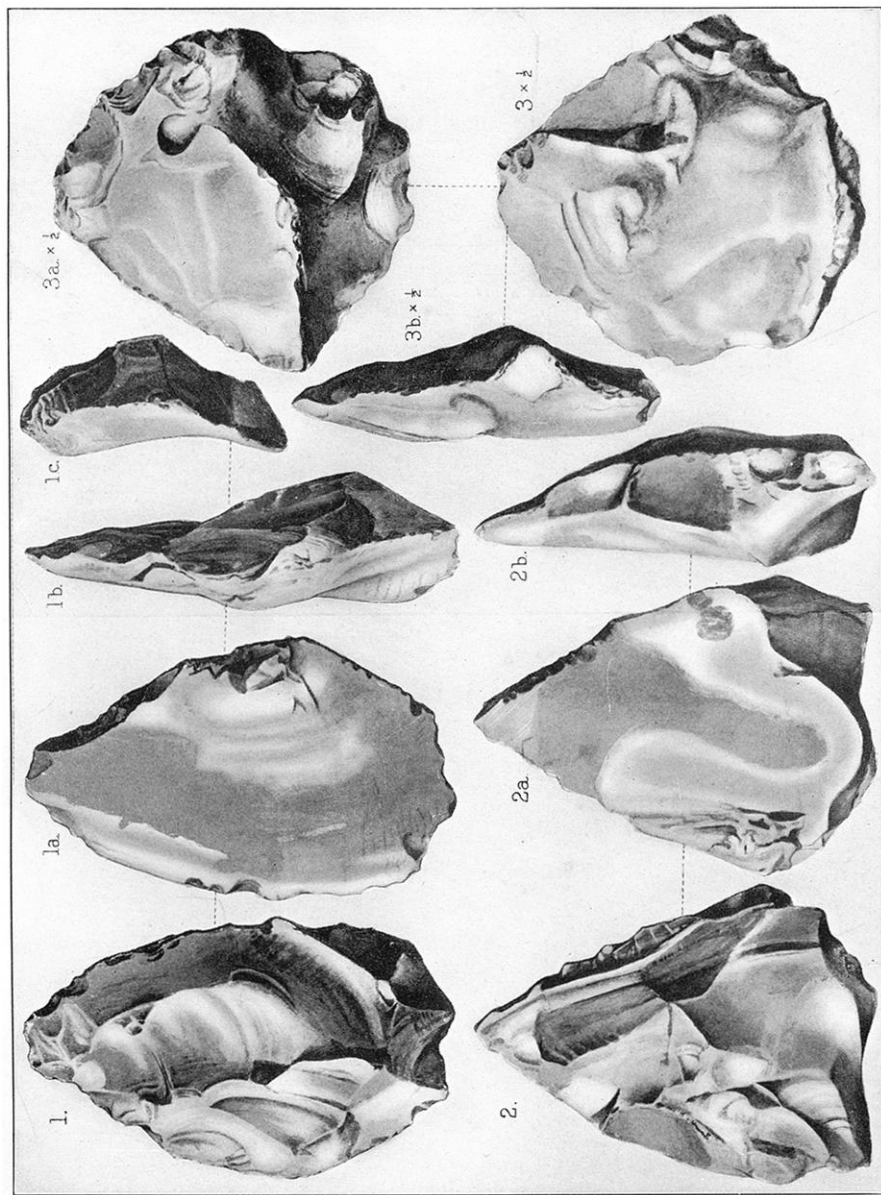
The form of the Heidelberg cranium can only be conjectured. The English scientists were more fortunate in that they recovered portions of both cranium and lower jaw. Comparing the parts in common, the Piltdown lower jaw is seen to be intermediate between the lower jaw of Heidelberg and that of a young chimpanzee. The height of the ascending ramus is somewhat greater, its breadth less, and the sigmoid notch deeper in *Eoanthropus* than in the specimen from Mauer. The ascending ramus is remarkable for the thickening of its antero-interior margin, thus affording

ample space for the insertion of the temporal muscle. The mylohyoid groove (m.g.) is behind rather than in line with the mandibular foramen. These and the complete absence of the mylohyoid ridge are characteristic of the apes rather than of man.

The transverse diameters of the first and second molars are less than in *Homo heidelbergensis*. While the antero-posterior diameters are identical in the two mandibles, the configuration of the horizontal ramus and the symphysis is such as to require a space of some 60 mm. for the setting of the anterior teeth in *Eoanthropus*; or 20 mm. more than in the Heidelberg mandible.

A comparison of the cranium with other ancient human skulls throws new light on the anatomical makeup of the earliest races of man. *Eoanthropus* has not the low sloping forehead and prominent brow ridge of even so late a type as Mousterian man; and yet according to Professor Elliott Smith its brain was the most primitive and most simian human brain thus far recorded. The Piltdown remains therefore tend to prove that in the lower Quaternary the differentiation among the Hominidæ had already progressed much farther than has been generally supposed; and that we shall have to go a long way back in the past to find the parting of the ways between the ancestor of man and that of his nearest of kin among the apes.

Mr Dawson and his associates are to be commended for the exercise of a diligent patience worthy of Darwin himself. The first piece was found about the time Schoetensack announced his discovery of the Heidelberg jaw. Mr Dawson simply kept quiet and continued his search for more evidence. Years elapsed between the finding of two pieces that would fit together, and only last summer were enough found to meet the requirements set for themselves by the discoverer and his associates. Thus have they quietly but none the less thoroughly built one more pier for the bridge that is to connect the present with the shores where the infancy of the race was cradled and its childhood played.



FLINT IMPLEMENTS OF RUDE CHELLEAN OR PRE-CHELLEAN FORMS

Fig. 2 came from a slightly higher stratum than the human and animal remains. After Dawson and Woodward in *Q. J. G. S.*, LXIX, 1913.